FIG.1

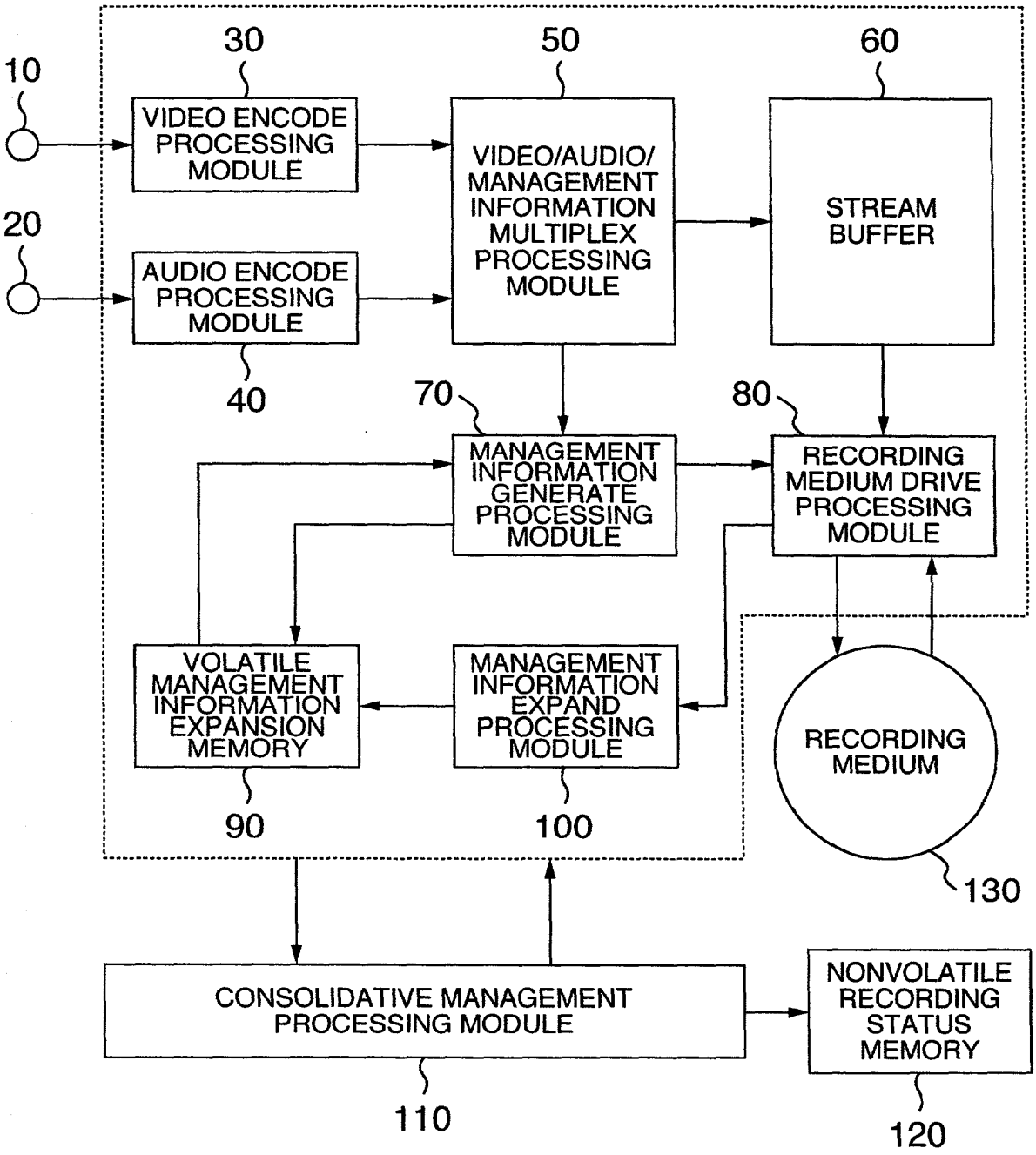

10
20
30
40
50
60
70
80
90
100
110
120
130
VIDEO ENCODE PROCESSING MODULE
AUDIO ENCODE PROCESSING MODULE
VIDEO/AUDIO/ MANAGEMENT INFORMATION MULTIPLEX PROCESSING MODULE
STREAM BUFFER
MANAGEMENT INFORMATION GENERATE PROCESSING MODULE
RECORDING MEDIUM DRIVE PROCESSING MODULE
VOLATILE MANAGEMENT INFORMATION EXPANSION MEMORY
MANAGEMENT INFORMATION EXPAND PROCESSING MODULE
RECORDING MEDIUM
CONSOLIDATIVE MANAGEMENT PROCESSING MODULE
NONVOLATILE RECORDING STATUS MEMORY

FIG.2

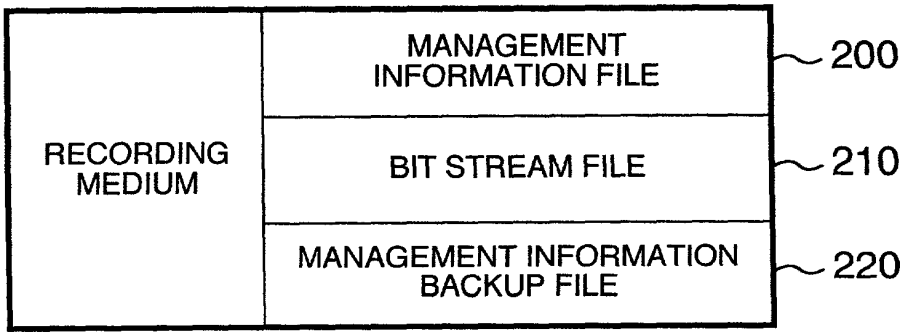
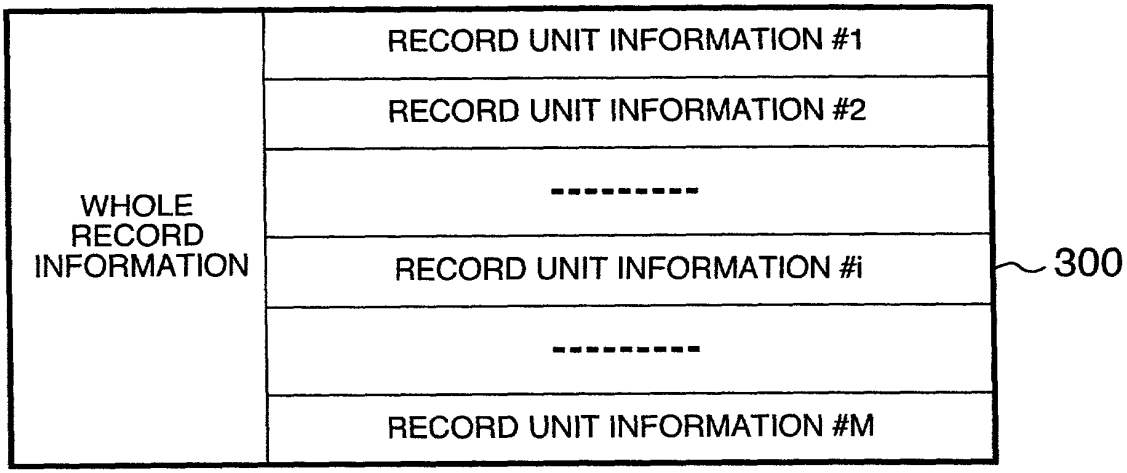

RECORDING MEDIUM
MANAGEMENT INFORMATION FILE
200
BIT STREAM FILE
210
MANAGEMENT INFORMATION BACKUP FILE
220

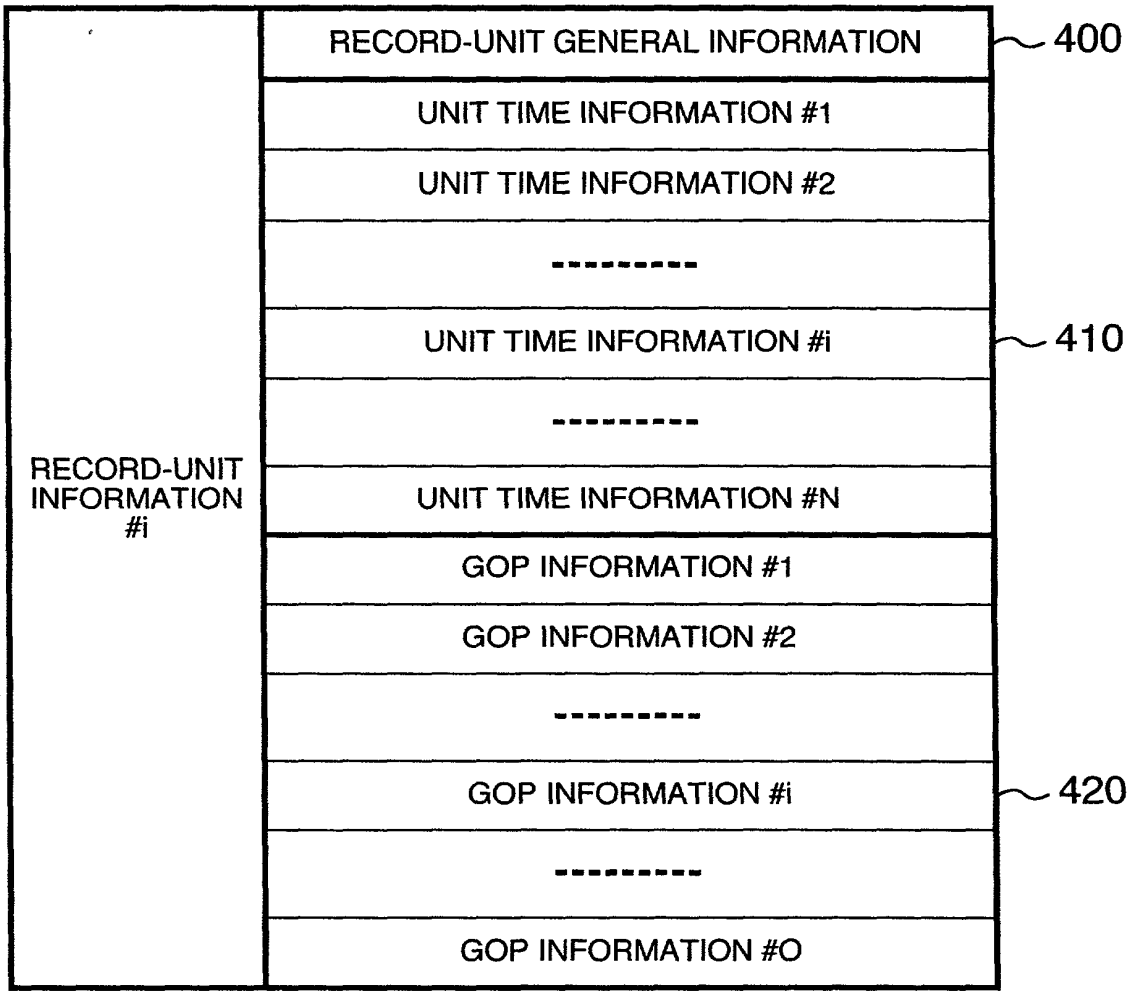
FIG.3


WHOLE RECORD INFORMATION
RECORD UNIT INFORMATION #1
RECORD UNIT INFORMATION #2

RECORD UNIT INFORMATION #i
300

RECORD UNIT INFORMATION #M

FIG.4


RECORD-UNIT INFORMATION #i
RECORD-UNIT GENERAL INFORMATION
400
UNIT TIME INFORMATION #1
UNIT TIME INFORMATION #2

UNIT TIME INFORMATION #i
410

UNIT TIME INFORMATION #N
GOP INFORMATION #1
GOP INFORMATION #2

GOP INFORMATION #i
420

GOP INFORMATION #O

FIG.5

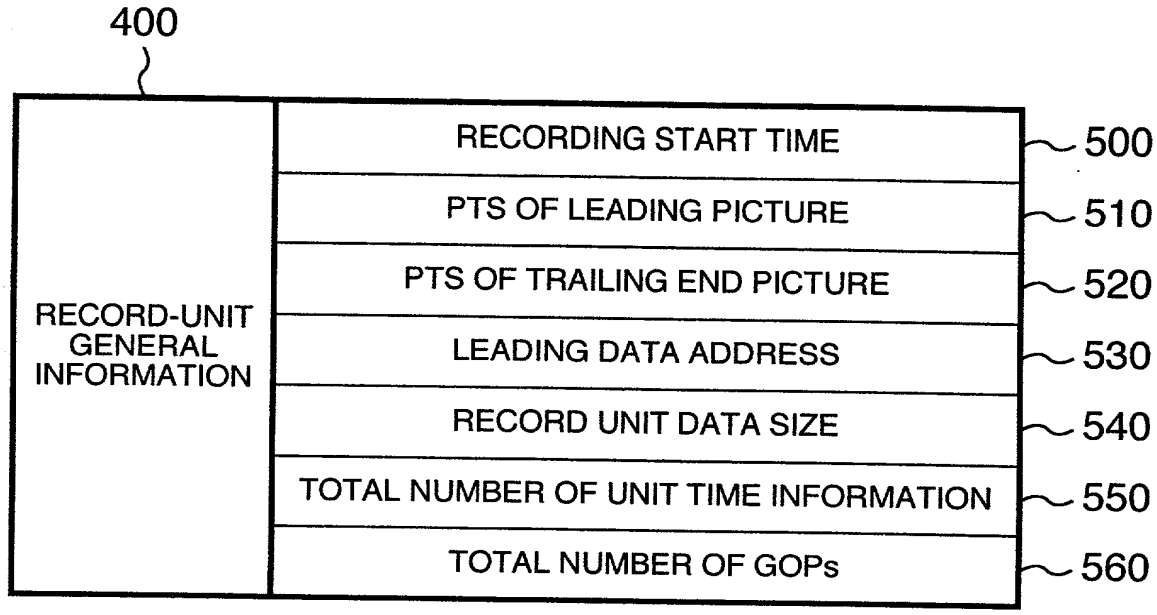

400
RECORD-UNIT GENERAL INFORMATION
RECORDING START TIME
PTS OF LEADING PICTURE
PTS OF TRAILING END PICTURE
LEADING DATA ADDRESS
RECORD UNIT DATA SIZE
TOTAL NUMBER OF UNIT TIME INFORMATION
TOTAL NUMBER OF GOPs
500
510
520
530
540
550
560

FIG.6

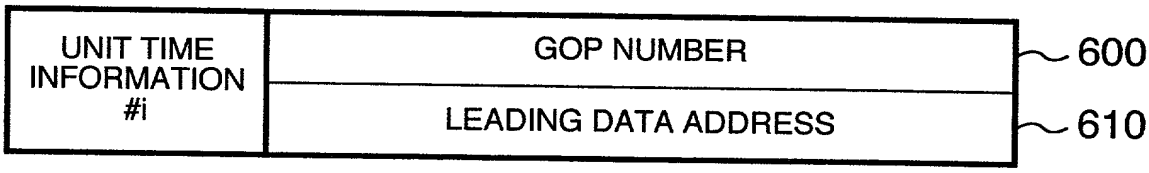

UNIT TIME INFORMATION #i
GOP NUMBER
LEADING DATA ADDRESS
600
610

FIG.7

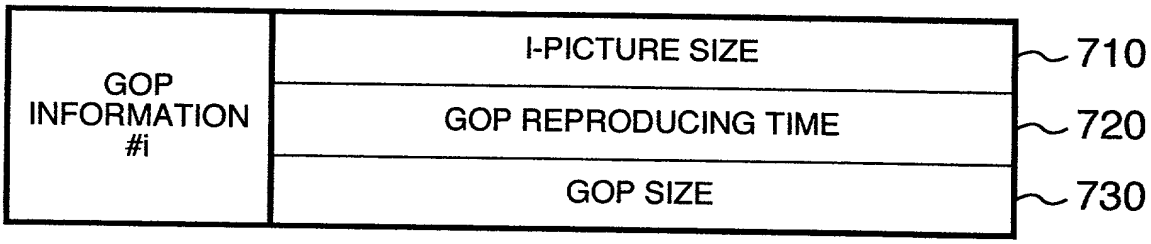

GOP INFORMATION #i
I-PICTURE SIZE
GOP REPRODUCING TIME
GOP SIZE
710
720
730

FIG.8

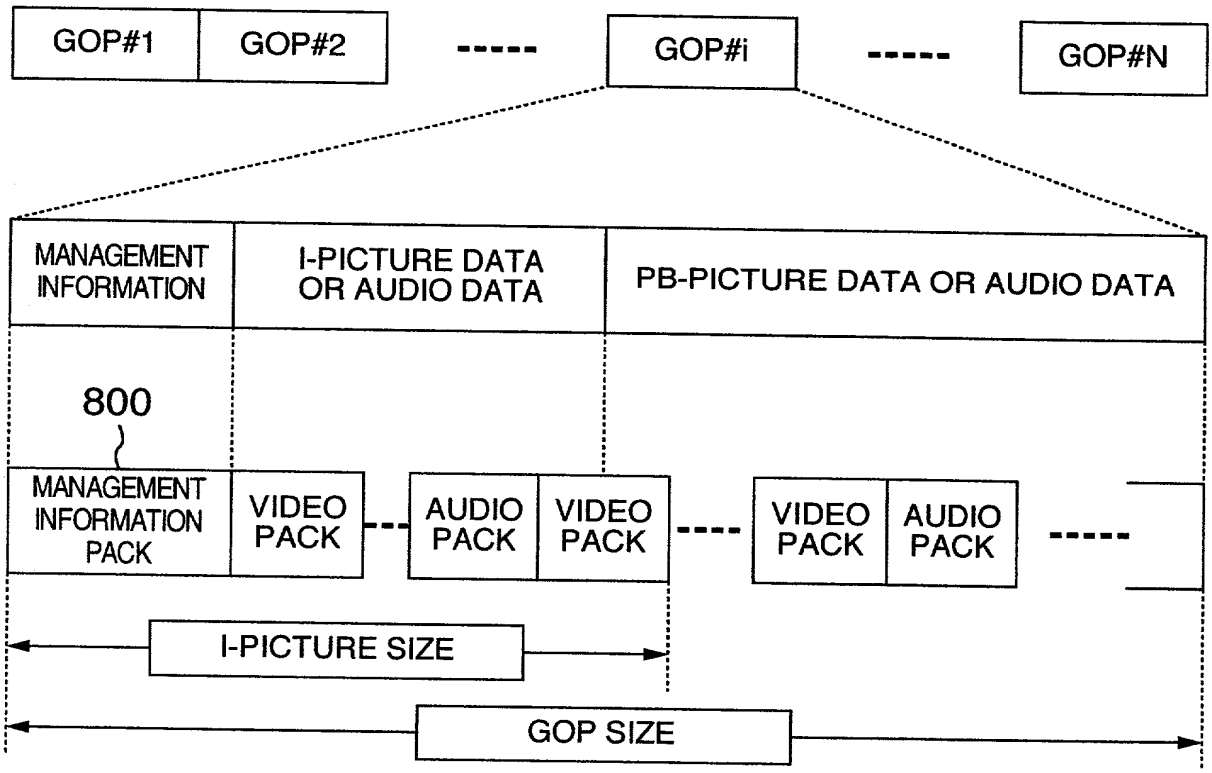

GOP#1
GOP#2
GOP#i
GOP#N
MANAGEMENT INFORMATION
I-PICTURE DATA OR AUDIO DATA
PB-PICTURE DATA OR AUDIO DATA
800
MANAGEMENT INFORMATION PACK
VIDEO PACK
AUDIO PACK
VIDEO PACK
VIDEO PACK
AUDIO PACK
I-PICTURE SIZE
GOP SIZE

FIG.9

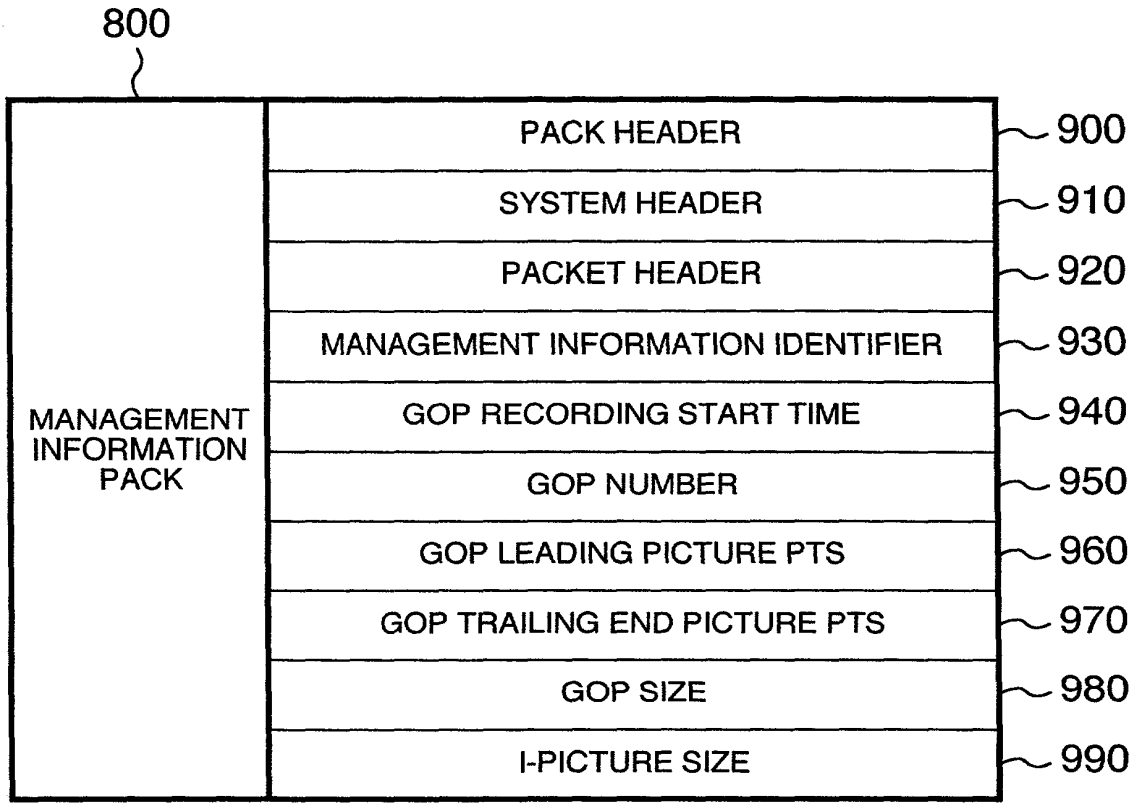

800
MANAGEMENT INFORMATION PACK
PACK HEADER
900
SYSTEM HEADER
910
PACKET HEADER
920
MANAGEMENT INFORMATION IDENTIFIER
930
GOP RECORDING START TIME
940
GOP NUMBER
950
GOP LEADING PICTURE PTS
960
GOP TRAILING END PICTURE PTS
970
GOP SIZE
980
I-PICTURE SIZE
990

FIG.10

CODE	STATUS	
1	MANAGEMENT INFORMATION EXPANSION STATUS	~1000
2	STREAM INFORMATION RECORDING STATUS	~1010
3	MANAGEMENT INFORMATION EXPANSION MEMORY UPDATE STATUS	~1020
4	RECORDING MEDIUM MANAGEMENT INFORMATION UPDATE STATUS	~1030
1	NORMAL END STATUS	~1040

FIG.11

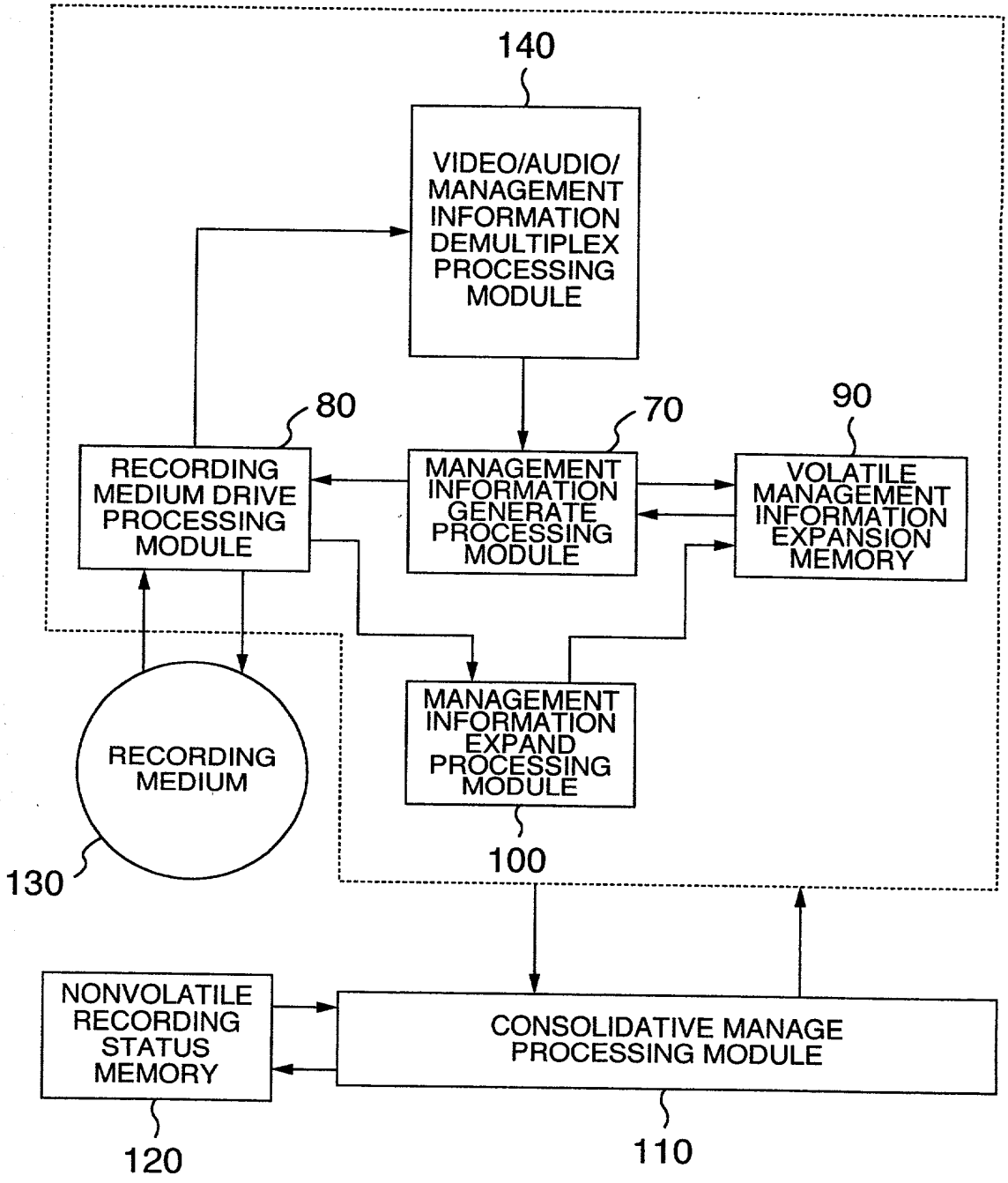

140
VIDEO/AUDIO/ MANAGEMENT INFORMATION DEMULTIPLEX PROCESSING MODULE
80
70
90
RECORDING MEDIUM DRIVE PROCESSING MODULE
MANAGEMENT INFORMATION GENERATE PROCESSING MODULE
VOLATILE MANAGEMENT INFORMATION EXPANSION MEMORY
RECORDING MEDIUM
MANAGEMENT INFORMATION EXPAND PROCESSING MODULE
130
100
NONVOLATILE RECORDING STATUS MEMORY
CONSOLIDATIVE MANAGE PROCESSING MODULE
120
110

FIG.12

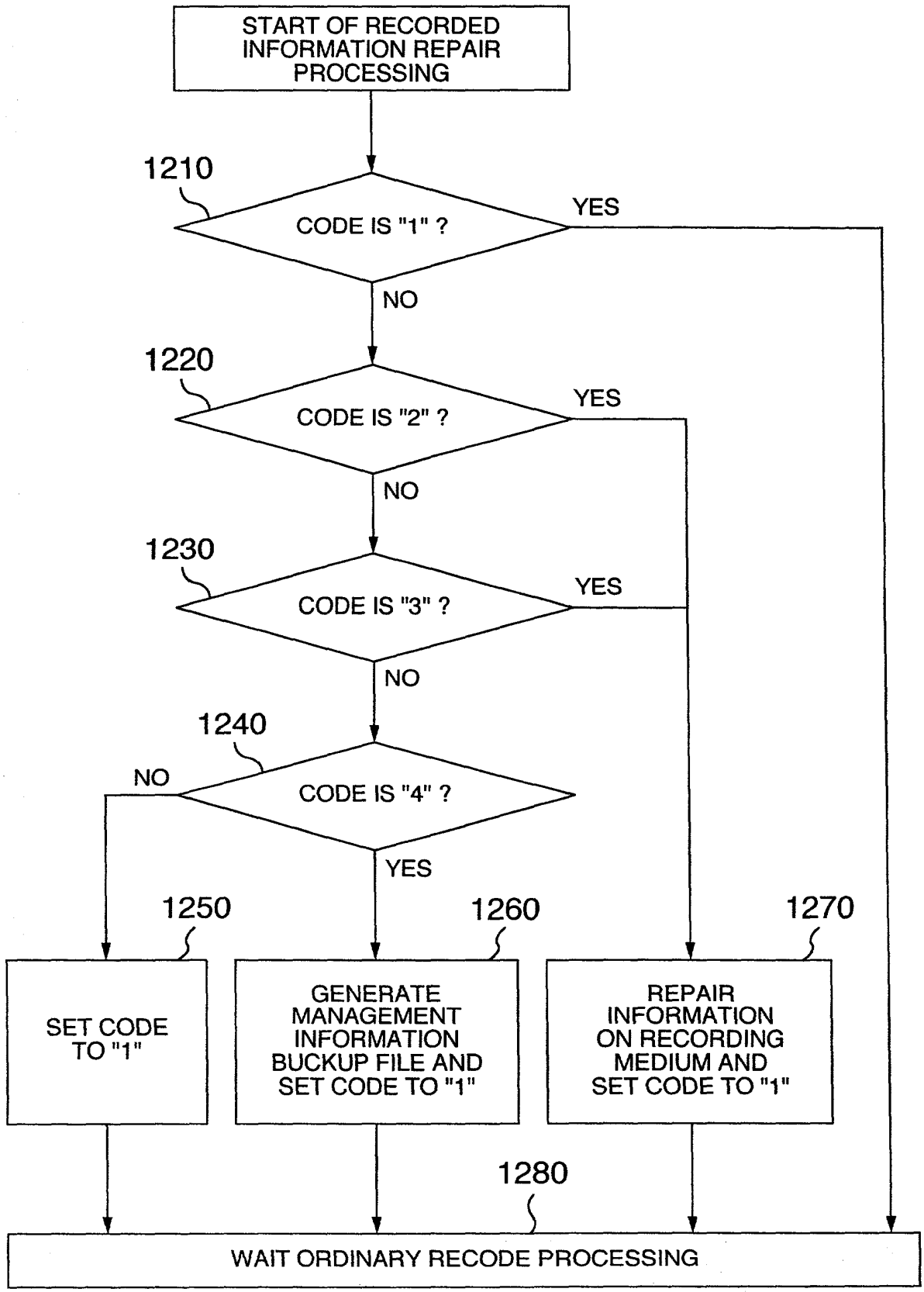

START OF RECORDED INFORMATION REPAIR PROCESSING
1210
CODE IS "1" ?
YES
NO
1220
CODE IS "2" ?
YES
NO
1230
CODE IS "3" ?
YES
NO
1240
NO
CODE IS "4" ?
YES
1250
1260
1270
SET CODE TO "1"
GENERATE MANAGEMENT INFORMATION BUCKUP FILE AND SET CODE TO "1"
REPAIR INFORMATION ON RECORDING MEDIUM AND SET CODE TO "1"
1280
WAIT ORDINARY RECODE PROCESSING

FIG.13

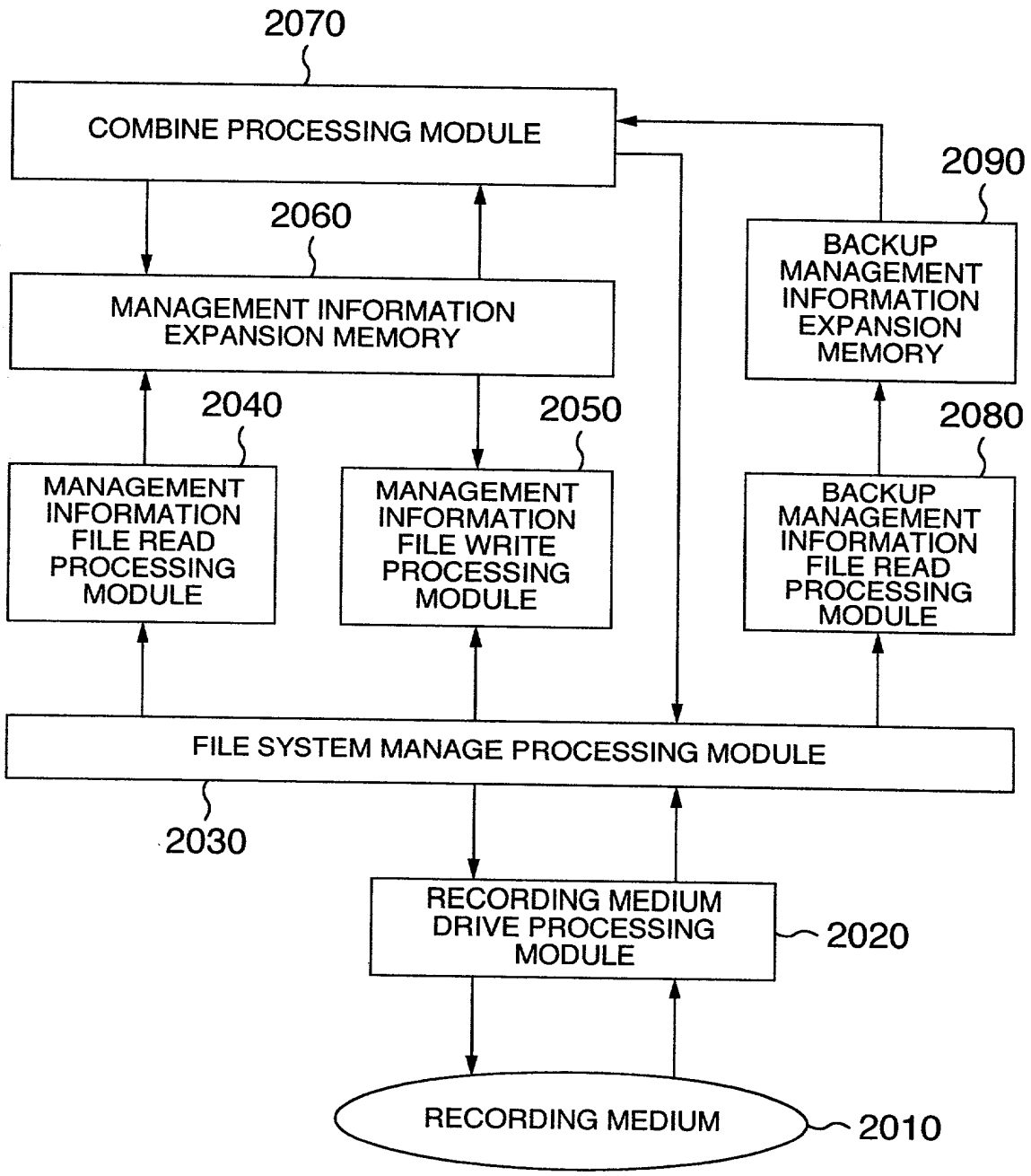

2070
COMBINE PROCESSING MODULE
2090
2060
BACKUP MANAGEMENT INFORMATION EXPANSION MEMORY
MANAGEMENT INFORMATION EXPANSION MEMORY
2040
2050
2080
MANAGEMENT INFORMATION FILE READ PROCESSING MODULE
MANAGEMENT INFORMATION FILE WRITE PROCESSING MODULE
BACKUP MANAGEMENT INFORMATION FILE READ PROCESSING MODULE
FILE SYSTEM MANAGE PROCESSING MODULE
2030
RECORDING MEDIUM DRIVE PROCESSING MODULE
2020
RECORDING MEDIUM
2010

FIG.14

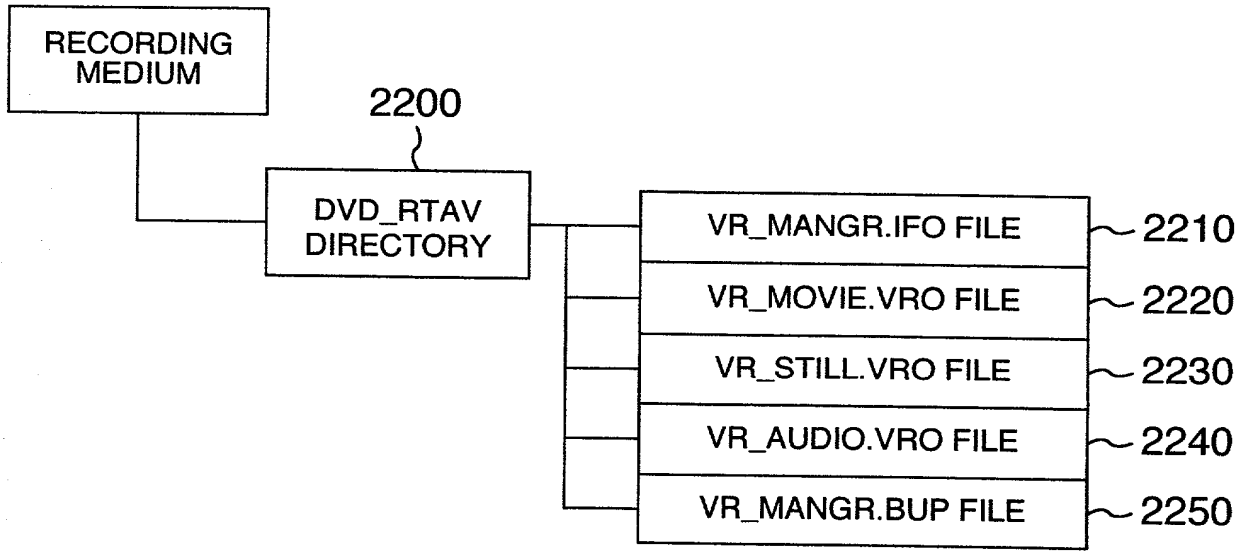

RECORDING MEDIUM
2200
DVD_RTAV DIRECTORY
VR_MANGR.IFO FILE
2210
VR_MOVIE.VRO FILE
2220
VR_STILL.VRO FILE
2230
VR_AUDIO.VRO FILE
2240
VR_MANGR.BUP FILE
2250

FIG.15

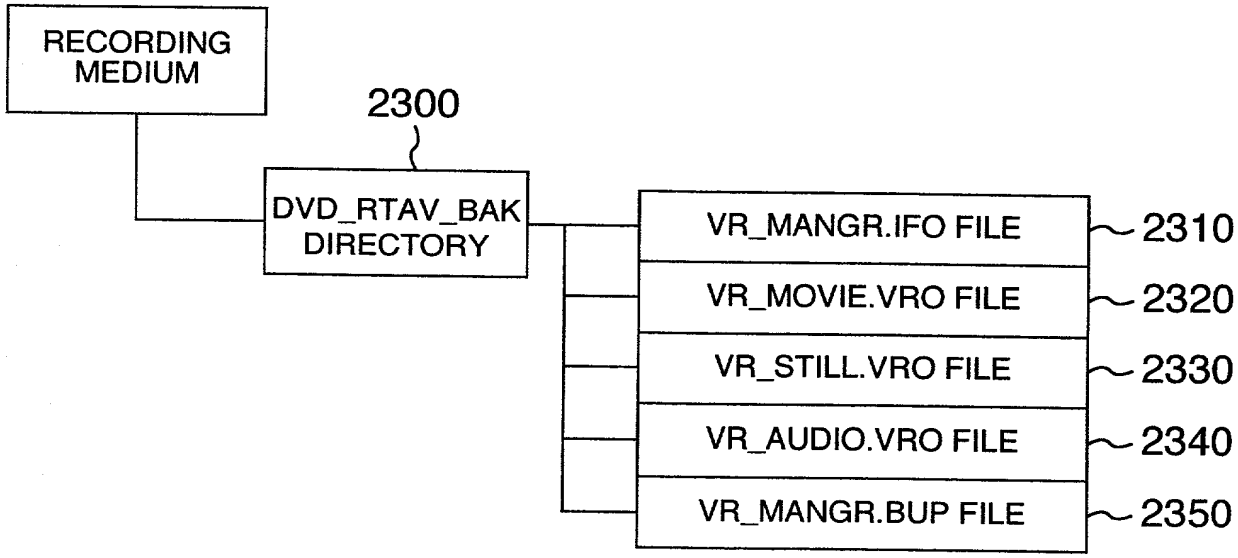

RECORDING MEDIUM
2300
DVD_RTAV_BAK DIRECTORY
VR_MANGR.IFO FILE
2310
VR_MOVIE.VRO FILE
2320
VR_STILL.VRO FILE
2330
VR_AUDIO.VRO FILE
2340
VR_MANGR.BUP FILE
2350

FIG.16

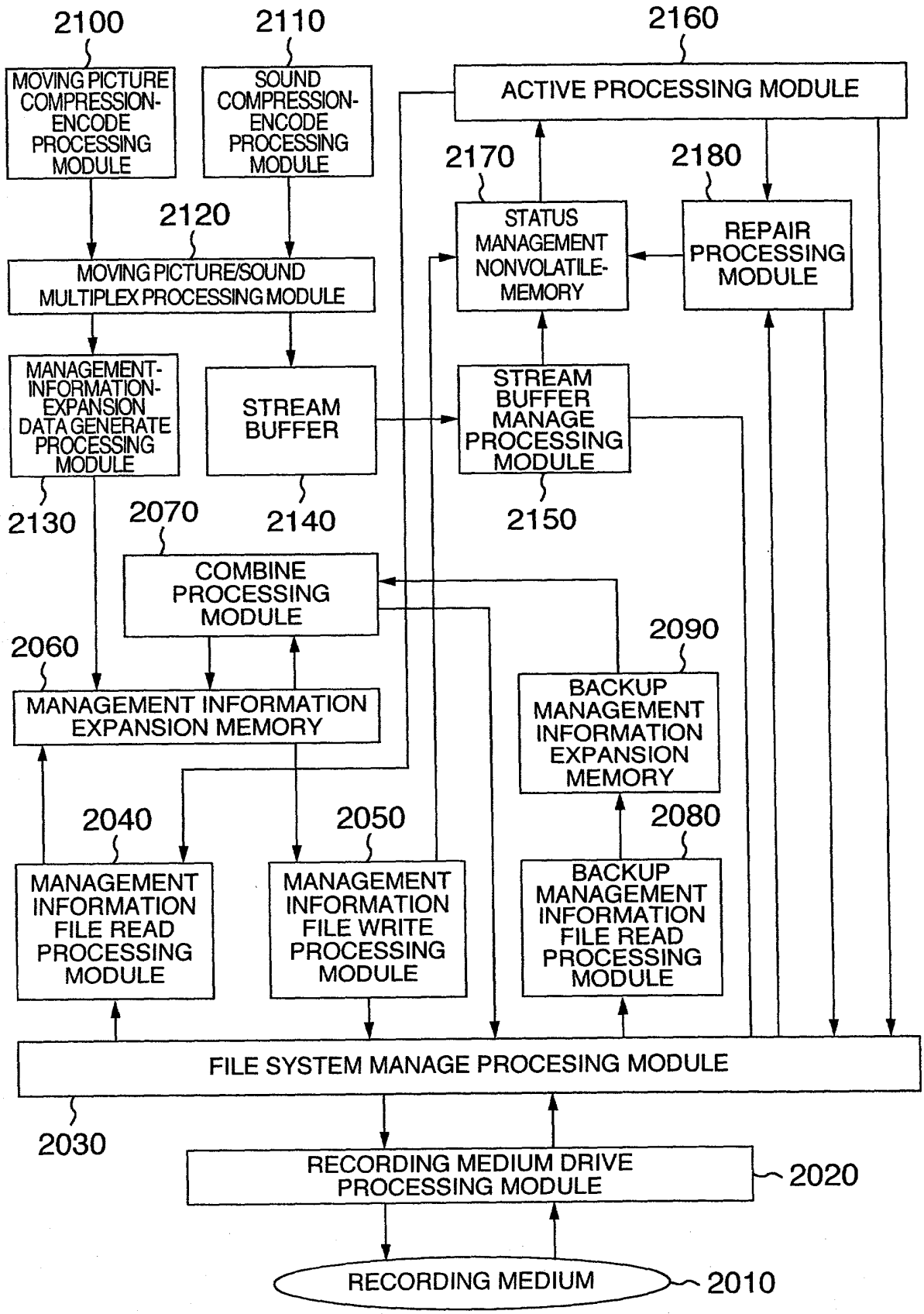


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FIG.17

CODE	MEANING	
0	NORMAL END STATUS	~2500
1	STRAEM WRITE STATUS	~2510
2	IFO WRITE STATUS	~2520
3	BUP WRITE STATUS	~2530

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FIG.18

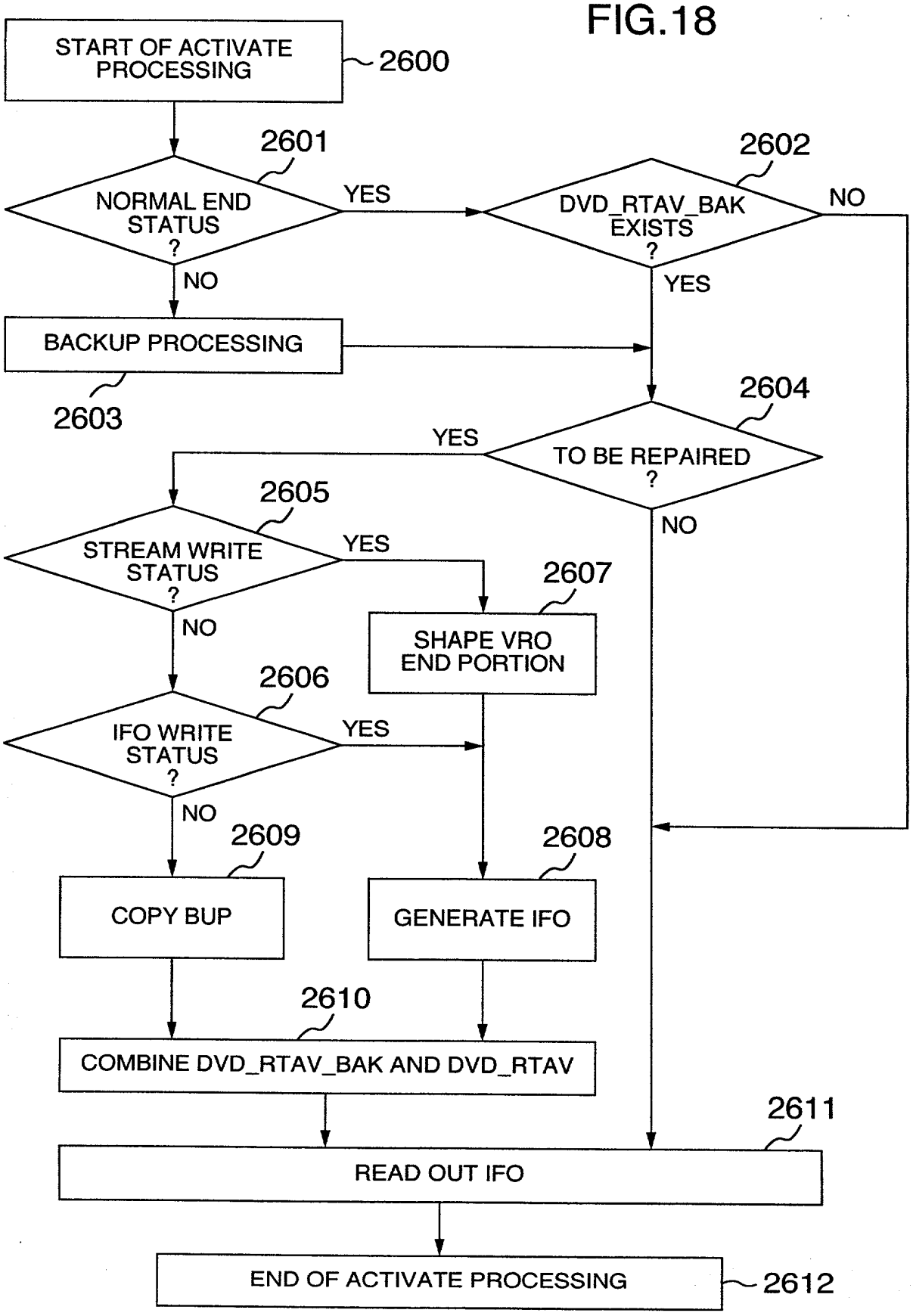

START OF ACTIVATE PROCESSING
2600
2601
NORMAL END STATUS ?
YES
NO
2602
DVD_RTAV_BAK EXISTS ?
NO
YES
BACKUP PROCESSING
2603
2604
TO BE REPAIRED ?
YES
NO
2605
STREAM WRITE STATUS ?
YES
NO
2607
SHAPE VRO END PORTION
2606
IFO WRITE STATUS ?
YES
NO
2609
COPY BUP
2608
GENERATE IFO
2610
COMBINE DVD_RTAV_BAK AND DVD_RTAV
2611
READ OUT IFO
END OF ACTIVATE PROCESSING
2612

FIG.19

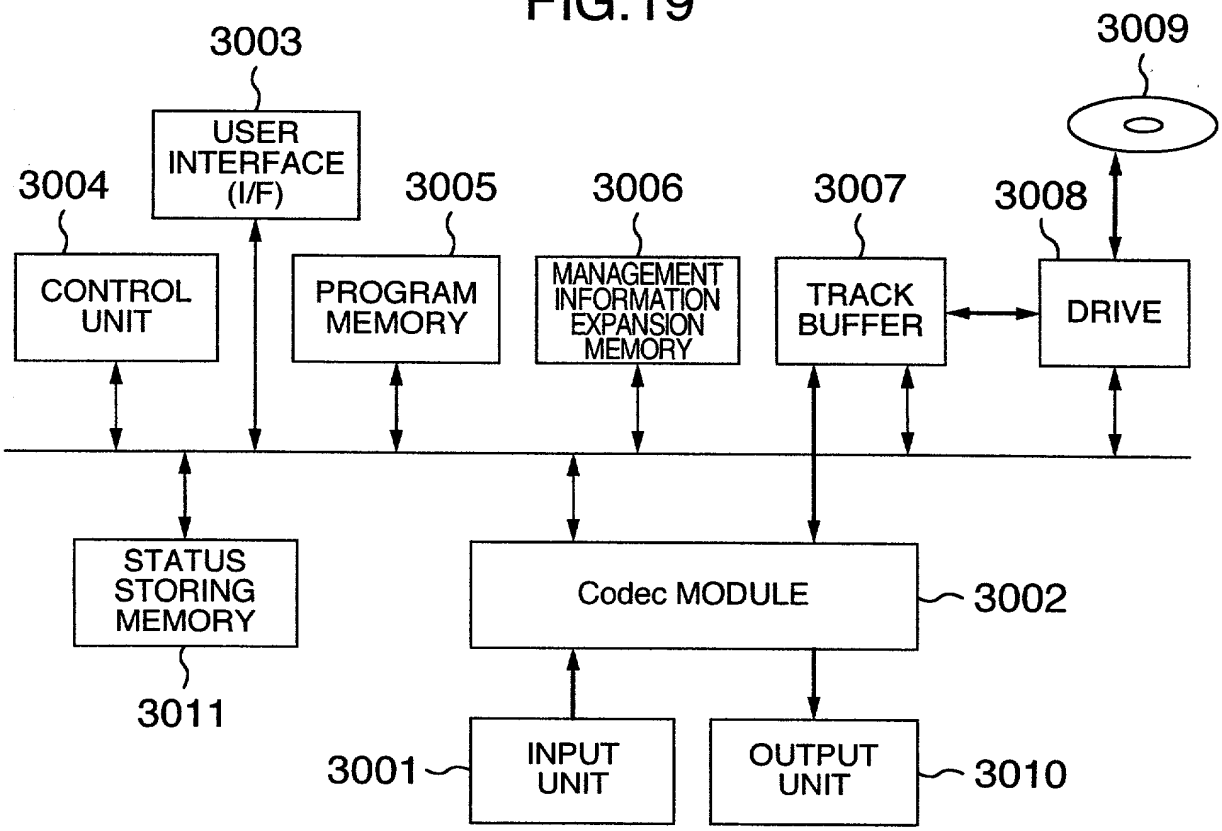

3003
USER INTERFACE (I/F)
3009
3004
3005
3006
3007
3008
CONTROL UNIT
PROGRAM MEMORY
MANAGEMENT INFORMATION EXPANSION MEMORY
TRACK BUFFER
DRIVE
STATUS STORING MEMORY
3011
Codec MODULE
3002
3001
INPUT UNIT
OUTPUT UNIT
3010

FIG.20

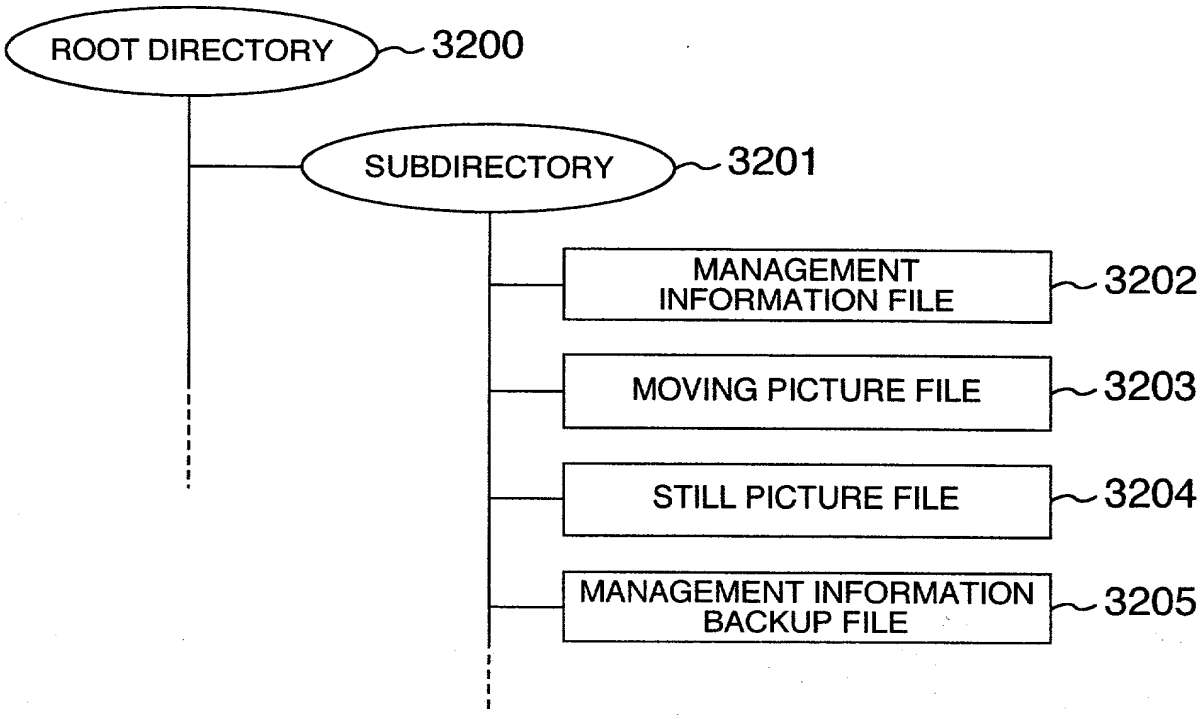

ROOT DIRECTORY
3200
SUBDIRECTORY
3201
MANAGEMENT INFORMATION FILE
3202
MOVING PICTURE FILE
3203
STILL PICTURE FILE
3204
MANAGEMENT INFORMATION BACKUP FILE
3205

FIG.21

STATUS	FLAG
MOVING PICTURE FILE BEING RECORDED	1
MANAGEMENT INFORMATION FILE BEING RECORDED AFTER RECORDING OF MOVING PICTURE FILE	2
STILL PICTURE FILE BEING RECORDED	3
MANAGEMENT INFORMATION BEING RECORDED AFTER RECORDING OF STILL PICTURE FILE	4
MOVING PICTURE FILE/STILL PICTURE FILE BEING EDITED	5
MANAGEMENT INFORMATION FILE BEING EDITED	6
MANAGEMENT INFORMATION BACKUP FILE BEING RECORDED	7
OTHER STATUS THAN THE ABOVE	0

P52526E-US

FIG.22

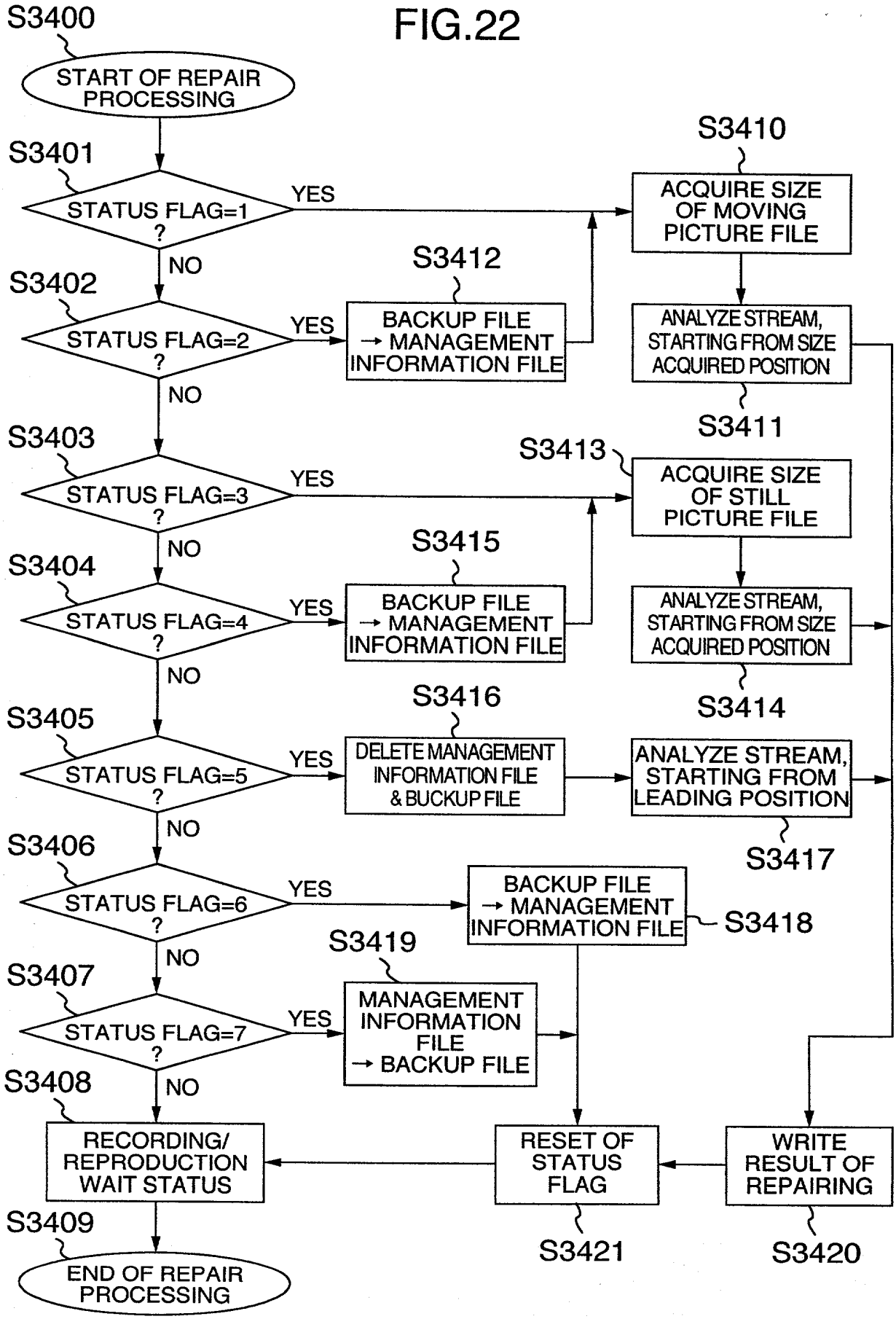

S3400
START OF REPAIR PROCESSING
S3401
STATUS FLAG=1 ?
YES
NO
S3402
STATUS FLAG=2 ?
YES
NO
S3403
STATUS FLAG=3 ?
YES
NO
S3404
STATUS FLAG=4 ?
YES
NO
S3405
STATUS FLAG=5 ?
YES
NO
S3406
STATUS FLAG=6 ?
YES
NO
S3407
STATUS FLAG=7 ?
YES
NO
S3408
RECORDING/ REPRODUCTION WAIT STATUS
S3409
END OF REPAIR PROCESSING
S3410
ACQUIRE SIZE OF MOVING PICTURE FILE
S3411
ANALYZE STREAM, STARTING FROM SIZE ACQUIRED POSITION
S3412
BACKUP FILE → MANAGEMENT INFORMATION FILE
S3413
ACQUIRE SIZE OF STILL PICTURE FILE
S3414
ANALYZE STREAM, STARTING FROM SIZE ACQUIRED POSITION
S3415
BACKUP FILE → MANAGEMENT INFORMATION FILE
S3416
DELETE MANAGEMENT INFORMATION FILE & BUCKUP FILE
S3417
ANALYZE STREAM, STARTING FROM LEADING POSITION
S3418
BACKUP FILE → MANAGEMENT INFORMATION FILE
S3419
MANAGEMENT INFORMATION FILE → BACKUP FILE
S3420
WRITE RESULT OF REPAIRING
S3421
RESET OF STATUS FLAG

FIG.23

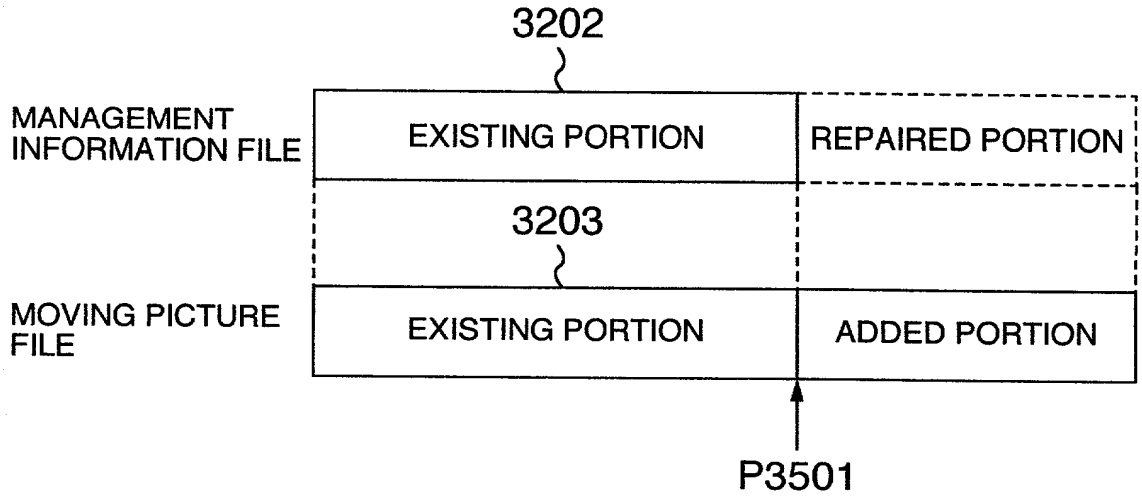

3202
MANAGEMENT INFORMATION FILE
EXISTING PORTION
REPAIRED PORTION
3203
MOVING PICTURE FILE
EXISTING PORTION
ADDED PORTION
P3501

FIG.24

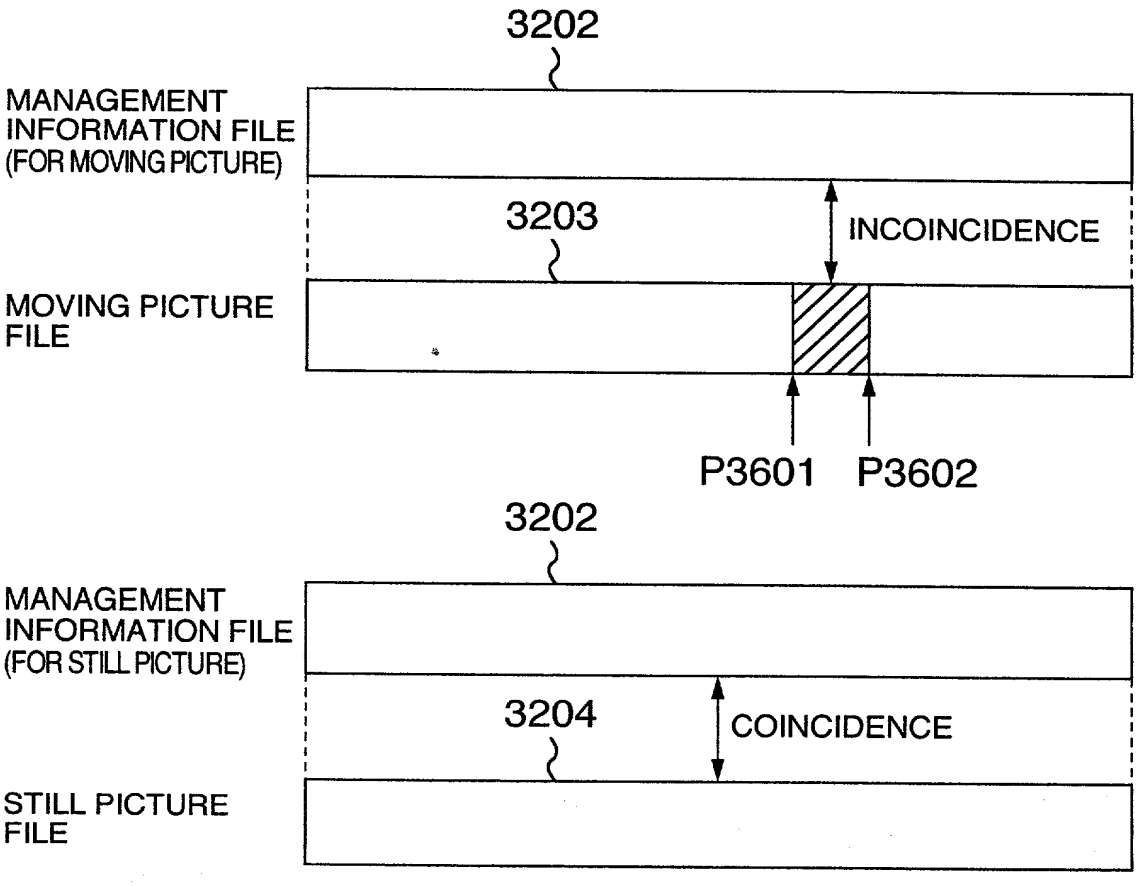
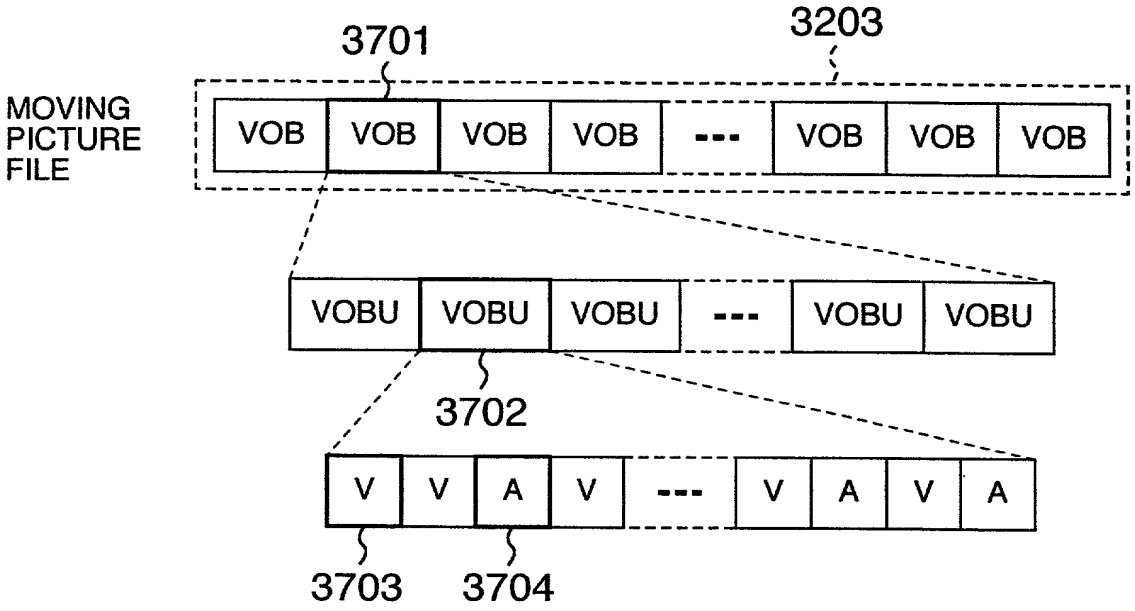

3202
MANAGEMENT INFORMATION FILE (FOR MOVING PICTURE)
3203
INCOINCIDENCE
MOVING PICTURE FILE
P3601
P3602
3202
MANAGEMENT INFORMATION FILE (FOR STILL PICTURE)
3204
COINCIDENCE
STILL PICTURE FILE

FIG.25


3701
3203
MOVING PICTURE FILE
VOB
VOB
VOB
VOB

VOB
VOB
VOB
VOBU
VOBU
VOBU

VOBU
VOBU
3702
V
V
A
V

V
A
V
A
3703
3704

FIG.26

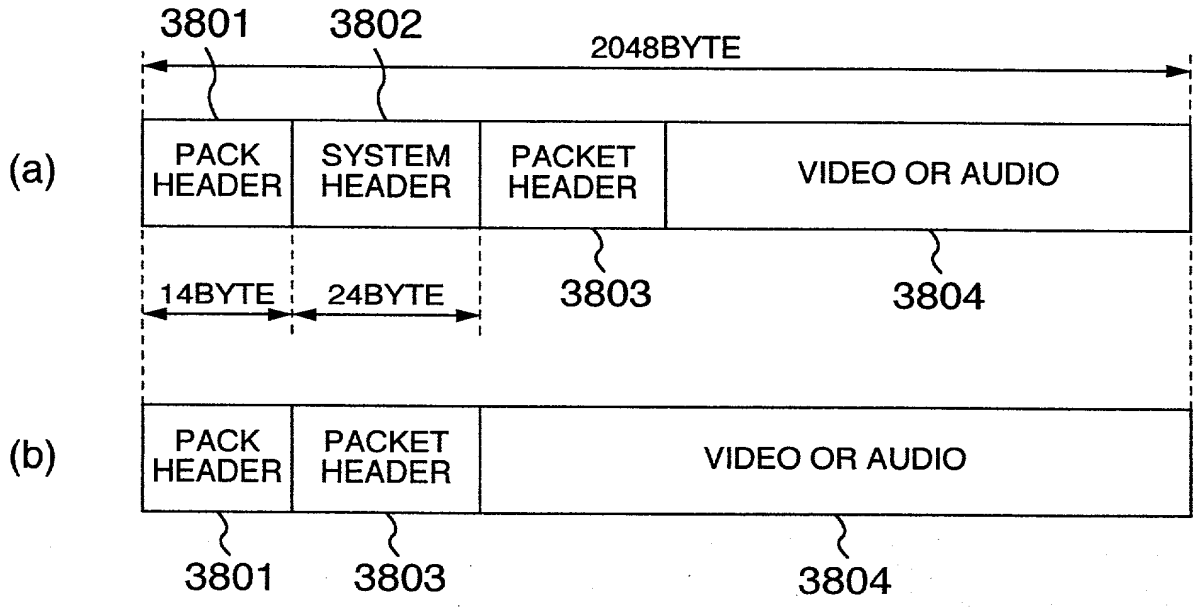
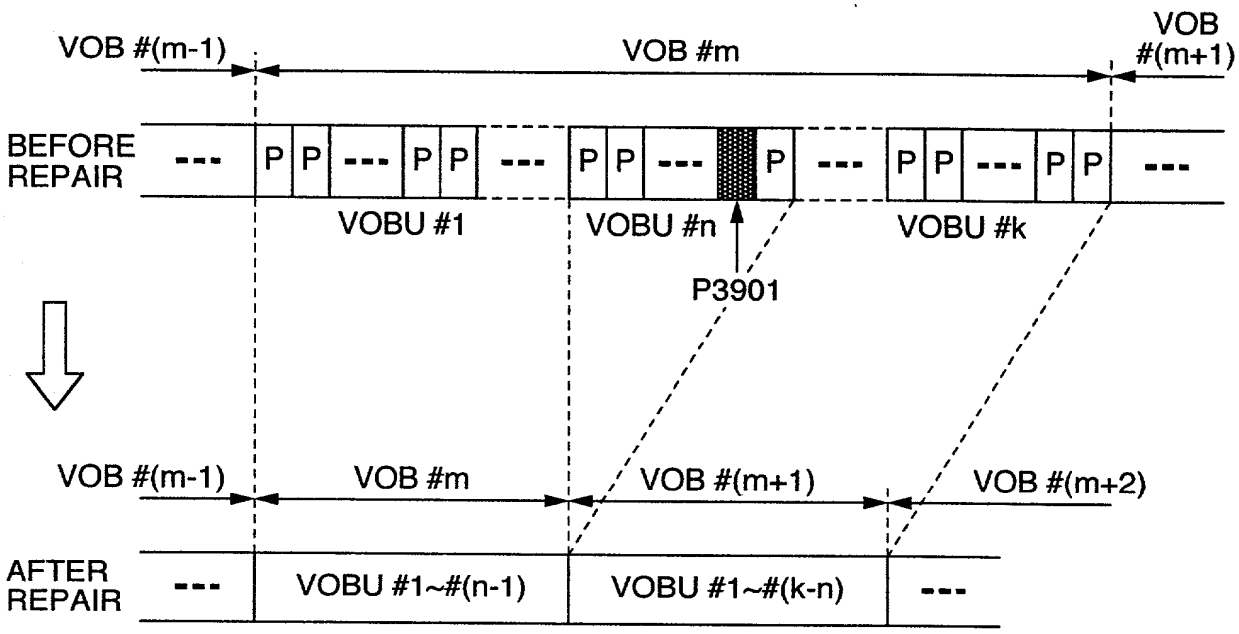
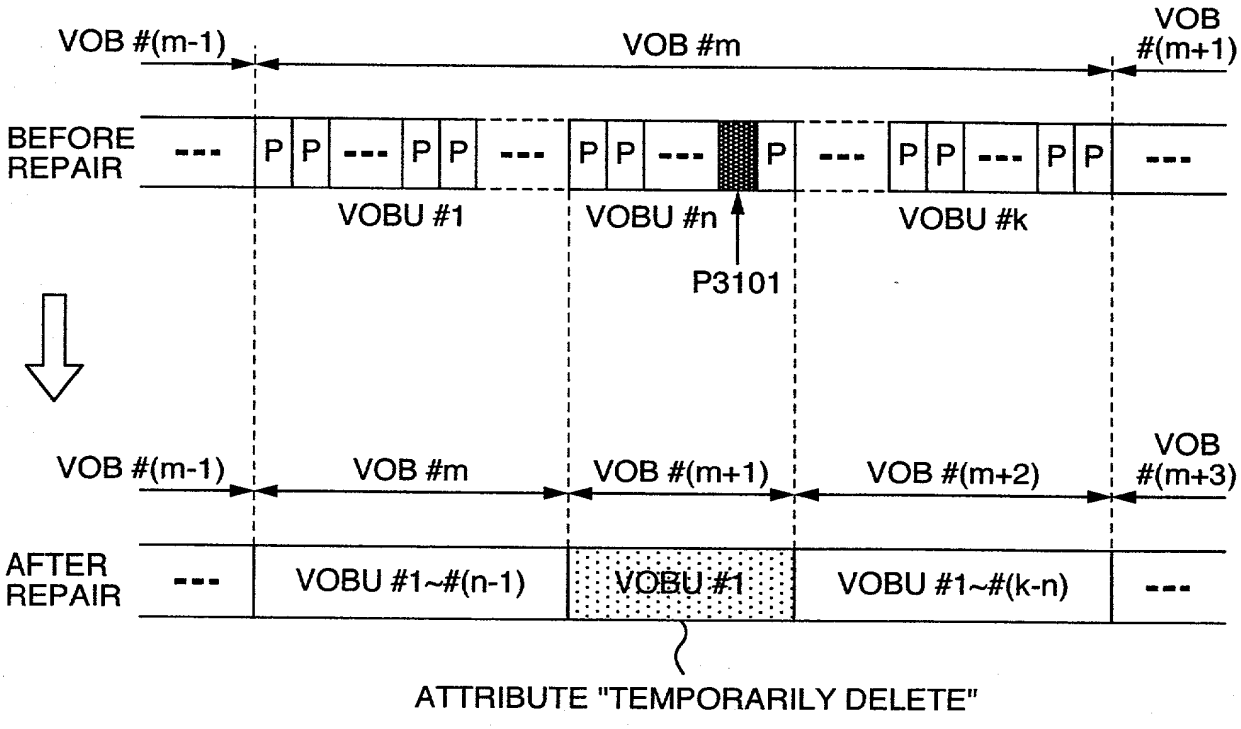

3801
3802
2048BYTE
(a)
PACK HEADER
SYSTEM HEADER
PACKET HEADER
VIDEO OR AUDIO
14BYTE
24BYTE
3803
3804
(b)
PACK HEADER
PACKET HEADER
VIDEO OR AUDIO
3801
3803
3804

FIG.27


VOB #(m-1)
VOB #m
VOB #(m+1)
BEFORE REPAIR

P
VOBU #1
VOBU #n
VOBU #k
P3901
VOB #(m-1)
VOB #m
VOB #(m+1)
VOB #(m+2)
AFTER REPAIR
VOBU #1~#(n-1)
VOBU #1~#(k-n)

FIG.28


VOB #(m-1)
VOB #m
VOB #(m+1)
BEFORE REPAIR

P
VOBU #1
VOBU #n
VOBU #k
P3101
VOB #(m-1)
VOB #m
VOB #(m+1)
VOB #(m+2)
VOB #(m+3)
AFTER REPAIR
VOBU #1~#(n-1)
VOBU #1
VOBU #1~#(k-n)
ATTRIBUTE "TEMPORARILY DELETE"